

plankton maximum still seems to be wrapped in mystery, and the same may be said of the greater productivity of the cooler waters.

Several theories have been proposed from time to time by Brandt and others to explain the vernal maximum, and of these Nathanson's appears to be the most fundamental. This author believes that vertical currents, which aid in the circulation of food materials, are responsible for the productivity of the sea in plankton. These currents are always present at certain places, and there one can always rely on finding a rich plankton. They are also present at certain seasons in other larger areas of the sea, and in lakes, and these seasons correspond to the times of maxima.

It is most probable that this explanation is not sufficient alone, and that the sunlight, the temperature of the water, and the chemical constitution are also determining factors.

The conditions surrounding the plankton are very complex, and it will probably require many years of investigation before the predominant factors in the problem can be discovered.

The work is slow and laborious, but still it aims at the solution of one of the most important problems in the metabolism of the ocean. This is the point of view from which the planktonic work at the Port Erin Biological Station is being carried out under Herdman's direction, and similar work is being prosecuted by planktologists elsewhere. It has lately been asserted that the most important part of the food of aquatic organisms is derived from organic compounds in solution in the medium in which they are living. At the present time it is impossible to say with any certainty how far this thesis may be correct, but whether it be the case or not, the plankton still retains its importance as either the immediate or the ultimate source of those organic substances upon which all marine and fresh-water animals depend.

WM. J. DAKIN.

NOTES.

It is announced in the July issue of *The Popular Science Monthly* that during his visit to Washington at the time of the annual meeting of the National Academy of Sciences Sir John Murray, K.C.B., F.R.S., presented a fund of £2000. to the academy for the purpose of founding an Alexander Agassiz gold medal, which is to be awarded to men of science in any part of the world for original contributions to the science of oceanography.

WE regret to announce that Mr. W. I. Last, director of the Science Museum, South Kensington, died on August 7 at his residence, 11 Onslow Crescent, S.W., in his fifty-fourth year. Mr. Last was apprenticed in 1873 with Messrs. Hayward Tyler and Co., and when barely twenty years of age won the Senior Whitworth Scholarship; he held his scholarship at the works of Sir Joseph Whitworth, and at the same time he followed a course of study at the Owens College, Manchester, gaining numerous prizes during this period. In 1886 he was elected an Associate Member of the Institution of Civil Engineers, and in the following year the council awarded him a Watt medal and a Telford premium for his paper on setting out the curves of wheel teeth. In 1890, after some years spent in practical work at home and abroad, he was appointed to the post of keeper of the machinery and inventions division of the South Kensington Museum; shortly afterwards the naval division was also entrusted to his care. Recognising that objects which involved mechanical movement are most intelligible as well as most attractive, both to students and to the public, when

shown in motion, he arranged numerous ways of effecting this under museum conditions. One of the best methods which he devised and introduced for this purpose was the supply of compressed air for working the objects by their own driving mechanism. The plan of sectioning objects to show the working parts of machines and details of construction was carried out by Mr. Last with much success. The collections have been very widely extended under his supervision. Mr. Last received his appointment as director of the whole Science Museum in 1904. The excellence of his work on the collections was the subject of comment in connection with the recent inquiry as to the museum.

THE death at Nice is announced, at the age of seventy years, of Dr. Louis C. De Coppet, distinguished by his researches on the solubilities of salts and the lowering of the freezing point of water by the presence of salts in solution.

WE are informed by the National Association for the Prevention of Consumption that it has been decided by the Rome authorities to postpone the International Congress on Tuberculosis, which was to have been held in Rome on September 24-30, to next April.

THE London County Council, on the recommendation of the Local Government Records and Museums Committee, has resolved that the whole of the objects of London interest collected by the Council from time to time, including the boat of the Roman period discovered on the site of the new County Hall, be offered on permanent loan to the trustees of the London Museum. The museum will be accommodated in the State apartments of Kensington Palace, which was placed by the King at the disposal of trustees for the exhibition of the collections. The accommodation at Kensington Palace is understood to be of a temporary nature, the intention being eventually to house the objects in a building worthy of London.

IT is announced in *The Times* that an experiment in the direction of utilising aeroplanes in the postal service of the country is likely to be undertaken shortly by the General Post Office. The proposal is for a regular aerial service for a limited period between London and Windsor. Arrangements have been made with a number of large firms for the fixing in their establishments of special "aerial" letter-boxes, in which letters intended for the aerial service must be posted. Daily clearances will be made by postmen, and the collections will be dispatched to the central clearing house. Here the letters will be placed in sealed bags and conveyed by motor-van to the aerodrome at Hendon, where the bags will be securely fixed to the machines. The airmen will then start on the journey to Windsor, covering the distance of 21 miles in, it is estimated, half an hour. At Windsor the aeroplane staff will be responsible for the conveyance from the aerodrome by road of all the letters to the town post-office, where they will be dealt with in the usual way.

THE annual autumn meeting of the Institute of Metals will be held at Newcastle-on-Tyne on September 20-22. Sir C. A. Parsons, K.C.B., F.R.S., is acting as chairman of the local committee, and Dr. J. T. Dunn as honorary secretary. The meeting will open at 10 a.m. on Wednesday, September 20, when the members will be welcomed at Armstrong College by the Lord Mayor of the city, Sir W. H. Stephenson, and the local committee, after which a series of papers will be read and discussed, Sir Gerard A. Muntz, Bart, president, being in the chair. In the afternoon members will have the opportunity of visiting

shipbuilding, engineering, metallurgical, and electrical works in the neighbourhood. In the evening there will be a reception of the members and their ladies, followed by a conversazione, in the Laing Art Gallery, by invitation of the Lord Mayor. On Thursday, September 21, papers will be read and discussed at a morning session of the institute, and in the afternoon there will be further visits to works. For September 22 the Tyne Improvement Commissioners have placed a steamer at the disposal of the local committee for a voyage to the mouth of the river and back.

THE ninth annual meeting of the South African Association for the Advancement of Science was held at Bulawayo on July 3-8, under the presidency of Prof. P. D. Hahn. The meeting was attended by members from Cape Town, Johannesburg, Salisbury, &c. The sectional presidents were as follows:—Section A, Rev. Father Goetz, S.J.; Section B, A. J. C. Molyneux; Section C, F. Eyles (Rhodesia); Section D, G. Duthie. In addition to the presidential addresses, numerous papers were read before the various sections. In particular, Mr. R. N. Hall's papers dealing with the Zimbabwe ruins gave rise to considerable discussion. Papers were read before Section A on electric clocks, by Prof. H. Bohle; aviation in South Africa from a meteorological point of view, by R. T. A. Innes; atmospheric electricity observations, by Prof. W. A. D. Rudge. Many interesting excursions were arranged by the local Bulawayo committee. The Khami ruins and various Bushman haunts were visited under the guidance of Mr. R. N. Hall. A pilgrimage was made to Rhodes's lonely grave in the Matopos, and after the conclusion of the meeting several days were spent at the Victoria Falls.

In the July issue of *The Quarterly Review* Mr. E. Clodd contributes a useful criticism of totemistic theories under the title of "Primitive Man on his Origin." While cordially welcoming Dr. Frazer's monumental treatise on totemism and exogamy, he is unable to accept his explanation of the origin of totemism from the Arunta theory of conception, mainly on the ground that it does not account for the clan totemism, which is admittedly of primary importance, and because, so far from being the most primitive, the Arunta are probably the most advanced of the Central Australian tribes. He is inclined to prefer Mr. A. Lang's solution that at the earliest period the groups were nameless; that later on they obtained soubriquets chosen from their fancied resemblance to this or that object; "no more than three things—a group animal name of unknown origin; belief in a transcendental connection between all bearers, human and bestial, of the same name; and belief in the blood superstitions—was needed to give rise to all the totemic creeds and practices, including exogamy." Needless to say, this solution involves certain special difficulties, of which Mr. Clodd is fully aware. The result of the discussion is to increase the feeling of doubt if any single solution hitherto advanced of the complex group of facts labelled as totemistic offers a reasonable explanation of them.

THE Journal of the Gypsy Lore Society continues its useful task of studying the eastern European groups of this interesting race. We have two articles of special importance, one an account of the Gypsies of Central Russia by Mr. D. F. de l'Hoste Ranking, the second of the organisation of the South German Gypsies by Mr. E. Wittich. The predatory habits of the Russian group amply account for the fear and hatred felt towards them by the rural population. On the other hand, in Germany their

moral standard seems to be decidedly higher, and their tribal organisation provides for the control of social order by the trial of offences committed by members under the superintendence of their chief at an annual assemblage held in Elsass, where the proceedings are conducted in secret session. This festival, however, often ends in a general free fight between rival members of the tribe, who take this opportunity of gratifying their feelings of revenge for bloodshed or other injuries. If a reconciliation of such quarrels is effected it is done by the exchange of glasses charged with their favourite liquor. The tribal code of social morality, with its curious system of taboos, one being that a man who eats or drinks out of a vessel which a Gypsy woman has touched with her dress or stepped over becomes an outcast, will be of much interest to students of primitive usages.

IN the same issue of the Gypsy Lore Journal Mr. J. Teutsch describes a curious form of primitive lathe, revolved by a string, which is used by Gypsy spoon-makers at their settlement in Kutusch, north of Kronstadt. The bowl of the spoon is first shaped with a set of knives and scrapers. The handles are then turned in this rude lathe, the woman worker decorating them with a series of circular stripes and bands by pressing against the wood as it revolves a rag soaked in a green dye and moistened in saliva. The method furnishes some analogies to that used by the Indian makers of so-called "Benares toys," in which, by means of a similar rude lathe, pieces of lac of various colours are pressed against the toy as it is revolved, the heat produced by this friction causing the lac to become partially melted, and leading to the deposit on the wood of thin streaks of colour.

DR. DANIEL STARET communicates to the current number of *The Psychological Review* an interesting experiment upon the influence of suggestion, or unconscious imitation, on handwriting. More than a hundred persons were investigated by the following method. Each person was provided with a set of five sheets, on the first of which was written the instruction: "We desire records of your handwriting. Will you accordingly write out the words and sentences presented on the pages given you. Kindly do this without further questioning or reflection." The second sheet contained a short paragraph of typewritten material, the subject's written copy of which provided an illustration of his (or her) normal handwriting. The third sheet was of vertical, the fourth of slanting, script; the fifth contained unusually large script, all taken from American "copy-books," and written out by the subjects of the experiment. The measurements of the slope of the subjects' handwriting were subsequently made by means of a scale of variously inclined lines drawn on transparent paper, which was superimposed on the handwriting; three letters, *l*, *f*, *p*, were selected for measurement. The size of the letters was determined by measuring their horizontal width, the lengths of entire words being measured and divided by the number of letters. All the subjects who were investigated appeared to be (unconsciously) susceptible to this form of imitation, women showing a greater tendency towards imitation than men, and those persons who showed a large amount of change in slope also showing a large increase in the size of the letters. The more "vertical" writers were, of course, influenced more by the sloping than by the vertical copy; the opposite relation obtained with the more "slanting" writers.

THE composition of Indian yams, as furnished by chemical analysis, is discussed by Mr. D. Hooper in a short note published in the Journal and Proceedings,

Asiatic Society of Bengal (vol. vii., No. 3). Compared with potatoes, yams contain a larger proportion of fat and a smaller proportion of carbohydrates. The alkaloid dioscorine was detected in the tubers of several species, notably *Dioscorea daemona*; it appears that cultivation tends to reduce the amount of alkaloid.

UNDER the title of "Album général des Cryptogames," a new and elaborate iconograph arranged by Dr. H. Coupin is being published by the Librairie générale de l'Enseignement, Paris. It is announced that the work will deal with algæ, fungi and lichens, and that every genus and most of the species will be illustrated. A beginning is made with the lowest organisms, and the first volume, containing fifteen plates, illustrates eighty-three species under thirty-seven genera representing the family Chrysomonadineæ and part of the family Dinoflagellate; under the genus *Gymnodinium* seven species are illustrated in thirteen figures. The text is limited to a brief description of the figures, habitat, generic synonyms, and a reference under each species to the literature where fuller information can be found. The price of each part is 2.50 francs, but no estimate of the number of parts is offered.

AN article on the formation of anthocyanin in plants, communicated by Miss M. Wheldale to *The Journal of Genetics* (vol. i., No. 2), provides a carefully reasoned discussion of the chemical processes involved with the view of substantiating a proposed hypothesis explanatory of the mechanism underlying the phenomenon of soluble pigment formation. The arguments are based upon data derived from observations upon the general distribution of pigment, its formation, the conditions which lead to its appearance, and the enzymes detected at the time of its production. According to the hypothesis formulated, the soluble pigments of flowering plants, collectively termed anthocyanin, are oxidation products of colourless chromogens of an aromatic nature which occur in combination with sugar as glucosides; the process of formation of glucoside and water from chromogen and sugar is reversible; the chromogen can only be oxidised to anthocyanin after liberation from the glucoside, and the process is controlled by one or more oxidising enzymes.

FROM the report recently to hand on the work of the Edinburgh and East of Scotland Agricultural College, it appears that all the classes are overcrowded, and the lack of accommodation is now causing serious inconvenience. The fact that the number of students last season exceeded all previous records shows that useful work is being done, and is taken as an indication that, with better accommodation and with a college farm, even better work could be turned out. Bulletins are also issued by Mr. Bruce on potatoes and on grass land, demonstrating the kind of return that may be expected from applications of artificial manures.

AN interesting bulletin issued by the Nyasaland Department of Agriculture shows the great progress that has been made in the development of the cotton industry. The total export of cotton from the Protectorate is valued as follows:—

	£
1903	3
1904-5	5,914
1907-8	13,999
1908-9	28,355
1910-11	52,853 (eleven months only).

According to Mr. McCall, the director, there is still the possibility of much further growth. Some of the problems

connected with the extension of the crop are discussed in the bulletin.

IN making provisional estimates of the yields of crops, it is customary in the United States and in Canada to express the condition in terms of a hypothetical "normal" or "standard" crop. Mr. H. D. Vigor discusses the method in a recent issue of the *Journal of the Royal Statistical Society*, and shows that it has no sound statistical basis, since the standard for measurement is largely constructed in the imagination of the individual reporter. The various difficulties that arise when statisticians attempt to make deductions from the results are dealt with, and it is shown that a sounder method would be to express the probable yield as a percentage of the average yield during some convenient preceding period.

WE have received from Mr. J. B. Rorer, mycologist to the Board of Agriculture, Trinidad, his report for the year ended March, 1911, in which it is stated that the cause of two troublesome cacao diseases, the canker and black rot, has been successfully traced. It appears that both diseases are caused by one and the same fungus, *Phytophthora faberi*. A bacterial disease of bananas and plantains is also described by him, and the organisms have been isolated; they are similar to *B. solanacearum*, and are provisionally being called *B. musae*. Much attention is given to the mycological problems of the West Indies in *The Agricultural News*, the official organ of the West Indian Agricultural Department. Descriptions are given in several of the recent issues of miscellaneous fungi found during the past few months, some of which have not yet been identified.

ONE of the most promising methods of effecting improvements in agriculture is to bring to the notice of experts and of farmers those practices that are found useful elsewhere. It does not follow that a plan must necessarily succeed in any one place because it has been found beneficial in another, but a discussion of the factors cannot fail to be fruitful. The *Bulletin de la Société d'Encouragement pour l'industrie nationale* periodically publishes very interesting accounts of the agriculture of particular countries or districts, several of which have been referred to in these columns. In the current volume a good description of Canadian agriculture has appeared, and also of the agriculture of the Saint Brieuc district of Brittany. The method is one that might usefully be adopted more widely, and has in the past been used with great advantage in this country.

PUBLIC opinion in Australia is awakening to the harm done—to put it on no higher level—by the ruthless extermination of birds which modern millinery seems to demand, and to which heedless sportsmen contribute in no small degree. The matter is now being taken up by *The Journal of Agriculture of South Australia*, and in recent issues coloured pictures of protected birds and their eggs are given, with brief notes on description, habitat, food, &c. "The killing of our wading birds each year," it is stated, "not only renders South Australia ever more prone to plagues of grasshoppers, but is most certainly a prime cause of the decline of our fish resources. . . . In a day one ibis was found responsible for the destruction of 2410 grasshoppers, or so-called locusts. Yet each season this lovely and useful bird, together with numbers of cranes, spoonbills, and egrets fall victims. . . . It is the decimation of such birds which leads to the ever-increasing multitudes of crustaceans that destroy fish-spawn and young fish hatching out." We wish our contemporary success in its crusade.

IN *The Agricultural Journal of India* (vol. vi., part ii.) Mr. Keatinge continues his account of the rural economy of the Bombay Deccan, dealing now more particularly with capital. A high rate of interest prevails for several reasons: capital is scarce in the country, and there is no organisation enabling the cultivator to get into touch with the money markets of the towns; security is not always good, and the money-lender incurs some social odium. In consequence, a man raising a mortgage on good land has even in favourable circumstances to pay 9 per cent. interest, while in less favourable circumstances he may have to pay up to 24 per cent., and on personal security the rates go up to 100 per cent. There are two papers on cotton, one by Mr. G. S. Henderson on the exotic cottons in Sind, and one by Mr. P. Venkayya on the Cambodia cotton, a hardy long-stapled annual, yielding lint of a superior white colour. An interesting summary of the cotton investigations now in hand by the United Provinces Department of Agriculture is given by Messrs. H. M. Leake and A. E. Parr in part i. of the same journal; these fall under two headings, the production of an improved type or types suited to the conditions of the Provinces, and their introduction into general cultivation.

THE growing importance of the Suez Canal is shown by a Parliamentary paper recently issued, which gives the return of the shipping passing through the canal for the years 1908, 1909, and 1910. The net tonnage of the past year shows an increase of nearly three million tons as compared with 1908. The gross receipts in 1910 were the largest reached. The percentage of the British vessels amounted to 62.9 as compared to those of all other nations, Germany being second with 15.5 per cent., both showing an increase over previous years, while the remaining 21.6 per cent., representing all other nations, remain practically at the same rate.

THE annual report of the conservator of the River Mersey shows that since the commencement of the dredging and deepening of the bar at the mouth of the river upwards of 161 million tons of sand have been removed, the quantity for last year being 18½ million tons. The minimum depth of water maintained in the centre of the dredged channel is 30 feet 3 inches. Dredgers are now being employed in deepening the channel off the Askew Spit, the revetment on the south side of Taylor's Bank having been completed in November last. The report also states that during 1910 nearly two million tons of silt were dredged from the channel of the Manchester Ship Canal, the whole of which would have found its way into the estuary of the Mersey had not the canal works interposed.

FOUR years ago a scheme of irrigation was inaugurated for supplying water for agricultural purposes in a district in Canada near Calgary. The area of the district to be irrigated covers three million acres, and involves the construction of 4500 miles of canal, of which 1500 miles have now been completed. The main canal is 17 miles in length and 120 feet wide at the water-level, and is supplied from the Bow River. Storage is provided by a reservoir 3 miles long by half a mile wide, with a depth of 40 feet. The total cost of the whole work is estimated at three million pounds. In other parts of Canada also extensive irrigation works are in progress, notably in the fruit districts of Columbia. In this district the rainfall ranges only from 9 to 10 inches as a maximum, falling to as little as 2 inches in dry seasons. Without irrigation the land in this dry district would be worthless. The

area of Canada which is being opened up for fruit farming by irrigation extends over 30,000 acres.

COMMUNICATION No. 122 from the physical laboratory of the University of Leyden contains a paper by Prof. Kamerlingh Onnes on the disappearance of the electrical resistance of mercury at the very low temperatures obtained when liquid helium boils under reduced pressure. The resistance of the mercury filament in the liquid state at 0° C. was 173 ohms; in the solid state at the same temperature it would, if its temperature coefficient of resistance remained constant, have a resistance of 40 ohms. At 3° absolute its resistance had sunk below 3×10^{-6} ohms, that is to say, one ten-millionth of its resistance at 0° C. The resistance of constantin (eureka) remained nearly constant over the same range of temperature. In a second paper Prof. Onnes and Mr. A. Perrier show that paramagnetic and diamagnetic substances the magnetic susceptibilities of which at ordinary temperatures vary inversely as the absolute temperature at these very low temperatures, deviate considerably from Curie's law.

IN the Bulletin for 1910 of the International Association for Promoting the Study of Quaternions and Allied Systems of Mathematics, in addition to the usual list of members and the additions to the bibliography during the preceding year, there are some reviews by Prof. J. Birnie Shaw, the secretary. The most important is the critical examination of Burali-Forti and Marcolongo's books on their new notation for vector analysis. Prof. A. Macfarlane, the president, communicates a short address, followed by a paper on the unification and development of the principles of the algebra of space. Here the author gives a well-arranged argument in favour of his system of what might be called versorial analysis. He corrects Hamilton's view of the quaternion exponential, and develops what is undoubtedly a self-consistent system, in which the square of the vector is kept positive, and associative flexibility is obtained by the introduction of the imaginary. Complexities of an unexpected kind seem to spring out of his method, but as a piece of analytical reasoning it is of great interest. No illustrations are given of the practical value of the method.

A SMALL self-contained machine for the grinding and polishing of metal specimens for microscopic examination has been brought out by Messrs. R. and J. Beck, Ltd., and the apparatus possesses certain advantages which should render it particularly useful to metallurgists. The whole machine is carried on a small iron bed-plate, and consists essentially of a small enclosed electric motor of a substantial type and the polishing spindle proper; the motor drives a counter-shaft, and from this the drive is by a range of three-speed pulleys to the polishing spindle. The polishing discs themselves are detachable from the spindle, and run in a carefully designed casing, which not only serves to catch the spent polishing materials, water, &c., but also serves as a rest to the hand of the operator, and in an emergency saves the specimen from injury if it should accidentally escape from the operator's fingers. The attachment of the polishing cloth to the discs takes the somewhat novel form of a fairly stiff steel spiral spring acting as a species of garter, and, provided that the spring is strong enough to resist the centrifugal action at high speeds, this forms a most convenient form of attachment for both cloths and papers. With the addition of a suitable rheostat for controlling the speed of the motor, the machine should prove equal to all requirements for metallurgical polishing, although the use of separate machines

—in separate rooms, if possible—for grinding and polishing, respectively, is to be advocated.

Two years ago it was shown by Ramsay and Usher that a solution of thorium nitrate, left to itself for some months, gave off a certain quantity of carbon dioxide, and that under the action of the radium emanation the thorium solution gave off this gas much more rapidly. The view was put forward that the carbon of the carbon dioxide might have been produced during a transformation of the atoms of thorium by the action of the radium emanation. In the *Comptes rendus* of the Paris Academy of Sciences for July 24 M. Herschinkel gives a description of a repetition of these experiments. The production of a trace of carbon dioxide by the solution of thorium nitrate left to itself, and the increase of this amount under the influence of the radium emanation, were confirmed. It was, however, found that oxidation of the thorium nitrate with a solution of potassium permanganate also gave rise to the production of carbon dioxide, and this in spite of the great care taken in preparing a pure salt. The conclusion is drawn that the appearance of carbon dioxide under the conditions of this experiment cannot be taken as any evidence of the production of carbon from atomic transformation of the thorium.

AN article on scientific management and efficiency in the United States Navy, by Walter B. Tardy, appears in *The Engineering Magazine* for July. Less than 3 per cent. of all the shells fired in the battle of Santiago by the American fleet hit the enemy. There is no record that a single 12-inch or 13-inch shell took effect. The ranges were less than 3000 yards. Recently the *New Hampshire* used the old *Texas* as a target, firing at ranges from 10,000 to 11,500 yards, and landed whole salvos on the *Texas* whenever she wished. The *Michigan*, an all-big-gun ship, recently made twenty-two 12-inch hits at ranges of 10,000 yards while steaming at 15 knots, the target being only 60 feet long by 30 feet high. She fired forty-eight 12-inch shells, the percentage of hits being about 45; the shots were fired at the rate of about two per minute per gun. Organisation and strict attention to details are responsible primarily for the great improvement shown. Among other matters, coaling has received considerable attention, and the rate has been improved from 30 or 40 tons per hour to 200 tons per hour for the entire coaling period; some ships have taken on and trimmed as much as 350 tons per hour for the entire coaling period, with a record of about 550 tons for the best hour.

OUR ASTRONOMICAL COLUMN.

REDISCOVERY OF ENCKE'S COMET, 1911d.—A telegram from the Kiel Centralstelle announces that Encke's comet was discovered by Dr. Gonnessiat at the Algiers Observatory on July 31. Its position at 15h. 54.5m. (Algiers M.T.) was R.A.=7h. 27m. 54.5s., dec.=26° 54' 6" N., and its brightness was estimated as being about equal to the tenth magnitude; this position lies in Gemini very little south of Castor and Pollux.

Owing to its faintness and unfavourable position, it was not expected that this famous comet would be easily detected at this return; only under the most favourable conditions has it ever become a naked-eye object. The comet is famous as being the first short-period (3.3 years) comet for which the periodicity was established, and also for its very slow but persistent acceleration, which was held to be a demonstration of the existence of a luminiferous æther. According to M. Bosler and others, its brightness varies with the sun-spot activity through the eleven-year period.

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STELLAR PARALLAXES.—Dr. Schlesinger's discussion and summary of his parallax results obtained with the Yerkes 40-inch refractor—the seventh paper of the series—appears in No. 1, vol. xxxiv., of *The Astrophysical Journal*; only a few of the more interesting points can be noticed here. The results for four helium stars included in the programme confirms the proper-motion results in pointing to the fact that this class of stars is situated at an enormous distance from the earth, so much so that, taking averages, a fourth-magnitude helium star is probably as distant as the ninth-magnitude stars in the same region of the sky. Of these four, three give negative and one slightly positive parallaxes; no other star measured gave a negative value.

A practical point elucidated is that with such an instrument as the Yerkes telescope the number of parallaxes that may be determined per annum, with an average probable error of $\pm 0.013''$, is about the same as the number of fine nights.

Of the twenty-six stars given in the tabular summary, three, Groombridge 34, P.M. 2164, and Krüger 60, have parallaxes greater than $0.2''$; the mean values for these three are $0.266''$, $0.282''$, and $0.252''$ respectively.

During the minute examination of sources of error it was shown that measuring the plates in duplicate adds only 10 per cent. to their weights; such measurements were early discontinued. In some cases a rotating disc was employed to reduce the brightness of the parallax star, and the final probable errors show that no increased error was thereby produced.

PROMINENCES IN 1909.—Prof. Ricco's valuable summary of the Catania prominence observations for 1909 appears in No. 6, vol. xl., of the *Memorie di Astrofisica ed Astronomia* (June, p. 83). Compared with 1908, especially with the latter part of that year, the frequency and dimensions of the prominences showed an increase in 1909. Slight differences are seen in the mean latitudes, and the maximum frequencies—in 10° zones—occurred in 20° – 29° N. and the 30° – 39° S. latitudes. This was the only maximum in the southern hemisphere, but in the northern there was a minor maximum in the zone 50° – 59° N. The mean daily frequencies were 1.84 for the northern and 1.81 for the southern hemisphere, while the respective mean heliographic latitudes were 31.9° N. and 27.5° S. On 8 per cent. of the days of observation no prominences were seen during the first half of the year, while only two days (2 per cent.) yielded no prominences during the second half.

THE ALGOL SYSTEM RT PERSEI.—Contribution No. 1 from the Princeton University Observatory is a monograph, by Mr. R. S. Dugan, dealing with the observations of the Algol variable RT Persei made at the Halsted Observatory with the 23-inch telescope during 1905–8. After describing and discussing the observations, Mr. Dugan concludes that there is undoubtedly a secondary eclipse, that the two stars are practically equal in size, and that the reality of the light-changes between eclipses is fully guaranteed by the probable error.

JUPITER'S FAINT SATELLITES.—Observations of the fainter satellites of Jupiter are being kept up at the Transvaal Observatory. Four good exposures were made during April and May, but on one plate only is J viii to be found. Images of J vi appear on all the plates, and it is estimated that this object is at least two magnitudes brighter than J viii. The places given as yet are not final, but, brought up to the equinox of date, they show good agreement with those given by Dr. Crommelin's ephemeris. Observations of twelve minor planets, five of which are suspected to be new, were made during the satellite observations; temporarily the new ones have been designated T₁–T₅, and their positions are given with the above in Circular No. 8 of the Transvaal Observatory.

THE BRIGHTNESS OF COMETS 1908 III. AND 1910a.—The variations in the brightness of Morehouse's comet and in that of comet 1910a have been investigated in detail by M. Orlov, who publishes the results in No. 4513 of the *Astronomische Nachrichten*. Eliminating the terrestrial distance, he finds confirmation of the result that a comet's brightness varies more than is expressed by the formula $1/r^2 \Delta^2$. The ratio $1/\Delta^2/r^4$ is nearer the observed results, the index of r in the case of comet 1910a being 4.6.